R-0260-01-A

10. Will this revision delay contemporaneous reclamation due to a change in the mining method? _____ Yes, ___X___ No.

11. If the applicant answered "Yes" to any of items 7 through 10, complete the following items.

12. In the space below give the name and address of the newspaper in which the public notice is to be published.

Times-Leader
200 South Fourth Street
Martins Ferry, OH 43935

13. In the space below give the text of the public notice that is to be published.

See Appendix V

14. In the space below give the name and address of the public office where this application is to be filed for public viewing.

ODNR Division of Reclamation
District V Headquarters
68590 Bannock Road
St. Clairsville, OH 43950

Signature Fred H. Miller, Sr.
Fred H. Miller, Sr.
Title President - The Nacco Mining Company Date May 17, 1984

(FOR DIVISION USE ONLY)

The request is hereby Approved.

July 31, 1984
Date

Lanny Ramone
Chief, Division of Reclamation

1.0 Summary

The Nacco Mining Company plans to construct a new drainage control system at the Powhatan No. 6 Mine. The system will provide total sediment control for the watershed which contains the active refuse disposal area and the preparation plant.

The main structure within the system will be a sedimentation impoundment to be constructed in the stream channel of Perkins Run. Perkins Run will be permanently relocated into a channel cut through a low ridge and will discharge to Captina Creek approximately 1600 feet upstream of the present confluence. The impoundment will then be constructed below the stream relocation channel using borrow from the channel cut in combination with borrow from adjacent hillsides. The system of drainage controls which presently exists in the refuse disposal area will be modified such that all drainage will be directed into the proposed impoundment. It is anticipated that the quality of the water in the impoundment will not be suitable for direct discharge. A pumping system will be installed and the wastewater will be pumped to the preparation plant where it will be treated and used in the coal preparation process. The discharge from the preparation plant will be pumped to the existing slurry disposal impoundment; Outfall 001.

By the implementation of the plans described above, The Nacco Mining Company will be able to achieve compliance with OEPA regulations for control of discharges from future refuse placement in the existing refuse disposal area.

2.0 Government Agencies

Prior to beginning construction of the proposed drainage control system, The Nacco Mining Company submitted conceptual design plans to the appropriate government agencies eliciting approval of the project. A total of seven separate agencies excluding the Division of Reclamation were contacted. Initially, the U.S. Fish and Wildlife Service and the

ODNR Division of Wildlife were contacted on February 2, 1984. The former is unable to comment on the project due to a manpower shortage. The Division of Wildlife response is pending. The Soil Conservation Service conducted a prime farmland determination on the areas to be disturbed by the proposed project. The results of the SCS determination showed the absence of prime farmland and are contained in Appendix IV of DOR Permit Application No. 0341.

Authority to relocate Perkins Run falls under the purview of a Nationwide permit issued by the U.S. Army Corps of Engineers on July 22, 1982. Confirmation of the preceding was obtained from the Corps on February 14, 1984.

The Ohio Environmental Projection Agency, the Mine Safety and Health Administration and ODNR Division of Water have requested detailed plans of the proposed project design. Approval of the plans and permission to proceed with the project will be obtained from these agencies prior to construction.

3.0 Process Description

The Nacco Mining Company extracts coal from the Pittsburgh No. 8 coal seam by employing the continuous miner mining method. During 1983, Nacco mined approximately 1.7 million tons of raw coal which in turn yielded approximately 1.06 million tons of clean coal. The coal is cleaned, after extraction, in the preparation plant by Baum jigs and other mechanical means. Waste rock is separated from the coal and transported by trucks to the refuse disposal site. The active surface area of the refuse disposal site is subject to erosion and oxidation due to its exposure to air and rain. The drainage from the site is normally low in pH, high in metals content and high in suspended solids.

4.0 Existing Conditions

Presently, the drainage from the refuse disposal site is controlled by a system of ponds and pumps located adjacent to the refuse disposal site and preparation plant. This system is described under Ohio Coal Mining and Reclamation Permit Application No. 0341 submitted to the Division of Reclamation on March 29, 1984. Generally, the existing system provides for the collection of wastewater from the refuse/plant area and the subsequent pumping of that wastewater to the preparation plant. The water is then utilized in the coal cleaning process and discharged into the existing slurry disposal impoundment (Slurry Pond No. 2).

4.1 Water Circulation and Treatment System

Process water for the preparation plant is obtained from two sources which supplement each other to meet demand requirements. The sources include: 1) freshwater from Captina Creek; and 2) precipitation runoff and shallow ground water within the surface operations area.

A pumping system located adjacent to Captina Creek at the clean coal storage area is capable of pumping about 1450 GPM from the creek. The pipeline from the pumps splits at the plant. One line runs directly to the plant into the primary sump. The second line runs to a 100,000 gallon water supply storage tank located on the ridge to the north of the washhouse/office building. The purpose of the water supply storage tank is to maintain acceptable volumes of water in the plant during critical demand periods. Water from the tank is gravity drained on demand into the gland water sump or clarified water sump in the plant.

Precipitation runoff and shallow ground water in the surface operations area is collected by a system of ponds and sumps from which it is pumped to the preparation plant. This system includes Sediment Pond No. 2, Sediment Pond No. 6, Sediment Pond No. 8, the clean coal pile pond, the raw coal pile pond, the thickener settling pond, the refuse disposal runoff collection area and two concrete sumps located at

the toe of Dam No. 1 adjacent to Perkins Run. In addition, Sediment Pond No. 5 intermittently receives wastewater pumped from the slope and the mine elevator shaft and a small seepage collection area at the northeast limit of the refuse disposal area. All water collected in this system reports to the thickener settling pond from which it gravity feeds into the thickener. During normal operation of the thickener, clarified water overflows into a surrounding trough and flows into the clarified water sump in the plant. The clarified water sump supplies water directly to the jigs, where the initial preparation of the raw coal takes place in the plant. The gland water sump stores water for the various process pumps. Process water reports to the thickener where the solids are thickened and pumped to Slurry Pond No. 2.

The pH of the water in the thickener is critical to the process of flocculating the solids. Therefore, the pH is checked regularly in the thickener. If the pH drops below 6.0 S.U., caustic soda in 20% solution is added to the water in the thickener settling pond until the pH is brought back to a minimum of 6.5 S.U. The caustic soda is stored in an above-ground tank adjacent to the plant and added by manually opening a valve and allowing it to gravity flow into the pond.

The quality of the water which reports to the thickener settling pond is normally low in pH and high in metals content. Based on sampling information gathered on 2/15/84 and 3/5/84, the following illustrates the range of parameters experienced at principal collection points at the surface operations area:

SAMPLING POINT	RANGE			
	pH (S.U.)	Acidity(ppm)	Fe (ppm)	Mn (ppm)
Sediment Pond No. 2	3.2 to 6.6	0 to 86.0	7.9 to 44.0	0.94 to 3.64
Sediment Pond No. 5	2.9 to 6.4	0 to 320.0	18.3 to 79.0	4.18 to 6.2
Clean Coal Pile Pond	2.5 to 3.0	380 to 2400	102 to 573	4.08 to 25.7
Refuse Disposal Collection Area	3.0 to 5.6	32 to 526	42.9 to 80.0	3.32 to 6.7

Existing pumping rates from the runoff collection system to the

thickener settling pond are not well documented. However, it is estimated that during peak flows with all pumps operating, there can be as much as 800 GPM pumped to the raw coal pile pond (which gravity flows to the thickener settling pond) and the thickener settling pond. During peak flows, the pumps are normally operated manually to control the level of the thickener settling pond, thus precluding the situation where all pumps operate simultaneously for any extended period of time. It is necessary to operate the pumps manually, because the plant is designed to receive process water in controlled flows. The storm water surge is stored in the sediment ponds.

Process water exits the preparation plant from the thickener. As solids are removed from the solution in the thickener, they are drawn out as 'slurry', which normally contains 12%-15% solids and is pumped to Slurry Pond No. 2. The slurry pumping system consists of one 6" pump and two 5" booster pumps. This system is capable of pumping 810 GPM to Slurry Pond No. 2. The specific gravity of the slurry is normally maintained between 1.05 and 1.16. Based on a specific gravity of 1.2 and a pumping rate of 810 GPM, it can be estimated that the minimum volume of process water exiting the plant during operation is about 717 GPM.

4.2 Hydrology

Surface water characteristics presently existing in the immediate area of the proposed sediment pond are well documented through routine sampling procedures conducted by The Nacco Mining Company. Additionally, the Division of Water of the Ohio Department of Natural Resources has published information on the general characteristics of ground water in the Captina Creek Basin.[1] The geologic formations which yield underground water in the Captina Creek Basin comprise two general classes: 1) consolidated layers of sandstone, shale, coal, and

[1]McMahon Creek, Captina Creek and Sunfish Creek Basins - Underground Resources.

limestone; and 2) the unconsolidated deposits of sand, gravel and clay. In all likelihood, the narrow flood plain of Captina Creek immediately adjacent to the proposed sediment pond construction site consists of thin deposits of clay, silt, sand, and gravel, patchily deposited, which serve as a generally poor source of underground water. Large diameter wells developed in this area may yield as much as 25 GPM. Moving away from Captina Creek and into Perkins Run, potential yields of ground water decrease. This area normally has a thin deposit of alluvium on top of bedrock, which is dominantly limestone. Test borings in this area indicate the existence of ground water near original ground surface. Geologist's logs recorded in January 1984 are contained in Appendix I. TB-1 shows ground water at 33' in fractured limestone. TB-2 shows ground water at 7' below the surface of fill in alluvial soil above bedrock.

At the present time, there is no significant usage of ground water at or down gradient of the proposed construction site. The locations of three proximate wells are shown on the General Arrangement Plan, Drawing No. 6-030-1. Corresponding water quality information is contained in Appendix III. According to Moody and Associates, Inc. of Meadville, Pennsylvania, general hydrogeologic setting at the Powhatan No. 6 Mine is as follows:[2]

Ground Water Use:

1. Municipal - From information supplied by the Ohio Department of Natural Resources, there are no public supplies within the mine area.

2. Industrial - There are no known industrial supplies in the mine area.

3. Domestic - A total of 52 domestic well logs for Smith

[2]Groundwater Monitoring Plan, Nacco No. 6 Mine, September 1980.

and Washington Townships were obtained to review the general ground water use and characteristics of rock wells in the mine area, the following were determined:

a. The average depth of the wells is 80 ft.
b. The average yield is 3 gallons/minute (GPM).
c. 70% of the wells yield 2 GPM or less.

d. 29% of the wells show shale as the primary aquifer, 44% of the wells show limestone as the primary aquifer, and 27% of the wells show sandstone as the primary aquifer.

e. There is not a single widespread aquifer supplying a significant number of the wells.

f. The average transmissivity is expected to be less than 1,000 units for rock wells in this area.

Aquifer Properties:

1. Unconsolidated Aquifers - Very thin unconsolidated aquifers exist as alluvial deposits along and under Captina Creek. The extent and thickness of these deposits rarely make them useful for more than domestic use.

2. Rock Aquifers - Rock aquifers show very limited potential in this area.

Based on the domestic well records and the general hydrologic setting, ground water is expected to occur under water table, semi-confined, and confined conditions. Storage coefficients are expected to range from 10^{-2} to 10^{-4}, and transmissivities are normally

less than 1,000. Localized fractures in shallow rocks near streams may show higher production.

Primary permeability and porosity of the rock unit are generally low. As a result, most available ground water occurs in conjunction with secondary features such as joints and other earth fractures. The dry conditions in the mine and limited production of domestic wells indicate that the secondary porosity and permeability decrease with depth as fractures at depth are tight or closed.

The Nacco Mining Company has gathered information on the quality of surface waters in Captina Creek and Perkins Run for several years. In addition, an inventory of springs located in the Perkins Run watershed was taken in 1983. Appendix III contains the analyses of surface water and spring samples gathered during 1983. The locations of sampling stations are shown on the General Arrangement Plan, Drawing No. 6-030-1.

4.3 Geology

Location

Powhatan No. 6 is located near the western boundary of the Appalachian Plateau province which is situated northwest of the Folded Appalachians. The site is situated in the western portion of the Dunkard Basin, which is the northern most of three basins that comprise the Appalachian Plateau.

Stratigraphy and Lithology

The Dunkard Basin in the vicinity of Powhatan No. 6 contains rocks of the following ages and lithologies:

Geologic Period	Group	Formation	Lithology
Early-Middle Permian	Dunkard	Green and Washington	Interbedded sandstones, siltstones, shales, mudstones, clays, limestones, and coals.

Geologic Period	Formation	Lithology
Middle-Late Pennsylvanian	Monongahela	Interbedded sandstones, siltstones, clays, marine and non-marine limestones, mineable coals.
Middle Pennsylvanian	Conemaugh	Interbedded sandstones and shales (floor rock, Pittsburgh No. 8 coal).

The Pittsburgh No. 8 coal is deep-mined at the Powhatan No. 6 Mine. Rock units that could occur in the interval above the mine, but below the highest ridge, are as follows:

Jollytown Coal Horizon
Upper Washington Limestone member
Upper Marietta Sandstone member
Middle Washington Limestone member (upper tongue)
Middle Marietta Sandstone member
Middle Washington Limestone member (lower tongue)
Lower Marietta Limestone member (lower tongue)
Lower Marietta Sandstone member
Lower Washington Limestone member
Washington Coal (No. 12)
Underclay
Washington Sandstone member
Waynesburg "A" Coal Bed
Underclay
Waynesburg Sandstone member
Waynesburg (No. 1) Coal Bed
Underclay
Uniontown Sandstone member
Uniontown (No. 10) Coal Bed
Underclay
Uniontown Limestone member
McKeefrey Siltstone member
Little Captina Limestone member
Arnoldsburg Limestone member
Morningview Sandstone member
Ben Wood Limestone
Lower Tongue of the Morningview Sandstone member
Sewickley Sandstone member
Sewickley (No. 9) Coal Bed
Underclay
Fishpot Sandstone member
Fishpot Coal Bed
Underclay
Fishpot Limestone member
Redstone Sandstone member

Redstone (No. 8A) Coal
Redstone Limestone member
Pittsburgh (No. 8) Coal
Underclay

It is believed that Perkins Run lies on the resistant Morningview Sandstone and Ben Wood Limestone rock units. The low ridge separating Perkins Run from Captina Creek is upheld by resistant rocks that may occur in the interval between the Lower Morningview Sandstone and the Uniontown Limestone; the Uniontown (No. 10) coal bed is absent at the low ridge. Rock members that occur higher in the geologic section, up to the Jollytown Coal Horizon, are reported in the northern and western portions of the mine property at elevations above the top of the low ridge. A test boring drilled through the crest of the low ridge (TB-3, Appendix I) shows limestone to be the dominant rock-type, followed closely by siltstone and sandstone.

The soils existing along Perkins Run consist of a thin clay-gravel alluvial deposit which varies from 0-5 feet in thickness and which lies in contact with either bedrock or residual clays weathered from the dominant limestone bedrock (See Boring Nos. TB-1, TB-2, and Test Pit Logs in Appendix I, and laboratory test data in Appendix II).

Structure and Seismicity

The rock strata at the Powhatan No. 6 Mine are essentially featureless except for minor random undulations and a regional slope. Overall, the rock strata strike North 27° East, and dip gently to the Southeast at 19 to 30 feet per mile. The rock strata exhibit joints typical of Appalachian Plateau deposits and which may be attributed to stress-relief caused by the erosion of valleys. Seismic risk in the immediate area is very low, with the area being contained within Seismic Risk Zone 0 (Algermisson) and with horizontal ground accelerations of less than 0.05 gravity to be anticipated. Earthquakes having a Modified Mercalli intensity greater than IV are not known to have occurred within a radius of 100 miles of the mine.

4.4 Rights-of-Entry

Construction of the proposed project will take place on lands owned by The Nacco Mining Company. Construction will not occur in areas where mining is prohibited or limited as set forth in Section 1501:13-3-03 O.A.C. Implementation of the relocation of Perkins Run will necessitate surface changes within 100' of Captina Creek. Rights-of-entry information is contained in Appendix III of Permit Application No. 0341.

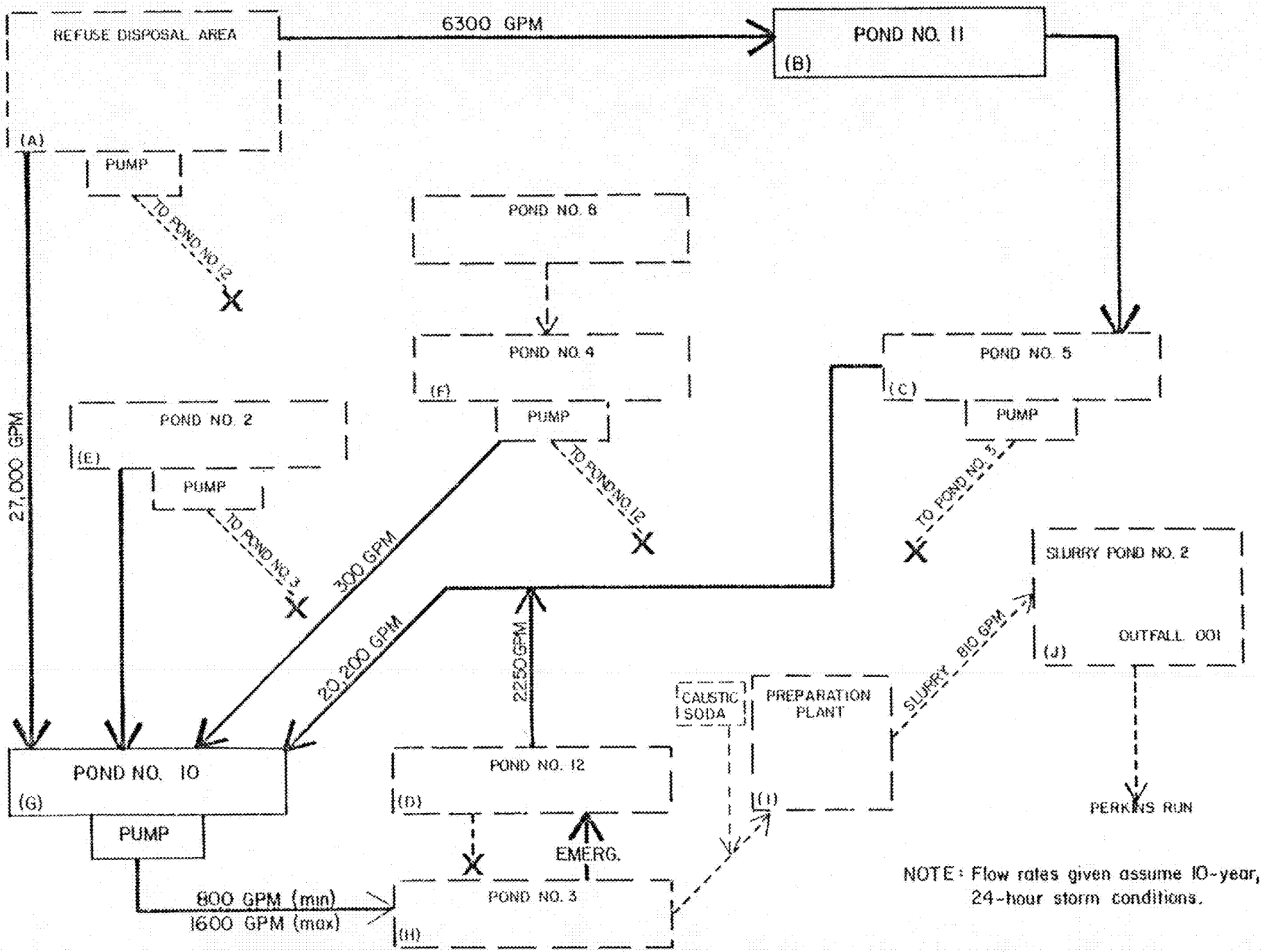
5.0 Wastewater

The construction of the proposed sediment pond and associated drainage system modifications will not alter the method of wastewater treatment now being utilized at Powhatan No. 6 Mine. Wastewaters are presently treated in the preparation plant and used in the coal cleaning process. Ultimate disposal of the wastewaters is accomplished by pumping the water from the plant to Slurry Pond No. 2 where it is clarified and discharged to Perkins Run via Outfall 001.

5.1 Wastewater Flow

The block diagram on page 14A shows the existing flow of wastewaters (dashed lines) and the integration of the proposed sediment pond and associated alteration in the flow of wastewaters (solid lines). The refuse disposal area (A) will be constructed such that drainage exits the area at points located in the southwest and the northeast corners of the area. Drainage directed to the southwest will be carried to proposed Pond No. 10 (G) by a 42" x 29" arched bituminous coated corrugated metal pipe and a rock-lined channel. Presently, a set of pumps conveys the drainage to existing Pond No. 12 and will continue to do so until refuse placement is brought up to grade with the arched pipe. Drainage directed to the northeast will be carried to proposed Pond No. 11 (B) by a rock-lined channel. Pond No. 11 is designed to provide initial sedimentation and storm surge capacity. Water from Pond No. 11 will be carried to the existing Pond No. 5 (C). Pond No. 5 presently pumps water to existing Pond No. 3. Pond No. 5 will be reconstructed, its pump system eliminated and will discharge to Pond No.

FLOW DIAGRAM



NOTE: Flow rates given assume 10-year, 24-hour storm conditions.

TOVCC 21040

Pond 10 DOR
Page 14A

10 via a drainage channel. Pond No. 5 will receive water from the discharge of Pond No. 12 (D) (raw coal pile pond) which has, in the past, served as a sump to collect water pumped from the Refuse Disposal Area and the clean coal pile pond (Pond No. 4). Pond No. 12 will be reconstructed to collect drainage from the raw coal pile area and decant to Pond No. 5. Existing Pond No. 2 (E) presently receives water pumped from two seepage collection basins located at the toe of Dam No. 1 in addition to drainage from the preparation plant area. A pump in Pond No. 2 conveys the water to the thickener settling pond (Pond No. 3). Under the proposed drainage system, the seepage at the toe of Dam No. 1 will be allowed to gravity drain to Pond No. 10, the pump will be removed from Pond No. 2 and the water will decant directly to Pond No. 10 via a 6" diameter PVC pipe. Existing Pond No. 8 decants to existing Pond No. 4 (F) (clean coal pile pond). Water from Pond No. 4 which is presently pumped to Pond No. 12, will be redirected to Pond No. 10.

A pumping system will be installed in Pond No. 10 to convey collected waters to Pond No. 3 (H) (thickener settling pond) which is located immediately adjacent to the thickener. Water flows by gravity to the thickener on a continuous basis as the underflow pumps are operating. Water entering the thickener is utilized in the preparation plant (I) processing system. Process water is pumped to Slurry Pond No. 2 (J) where solids are disposed of permanently. Clarified water discharges via Outfall 001 to the Perkins Run stream channel.

5.2 Wastewater Treatment

The proposed drainage control system will not significantly alter wastewater treatment methods. However, the system will experience an overall improvement in the control of the flow of wastewater through the Powhatan No. 6 surface operations area. All surface drainage will report to proposed Pond No. 10 which has been designed to retain the entire runoff from a storm greater than 10 year-24 hour duration. Peak inflows will be stored in Pond No. 10, allowing discharge to the thickener under controlled pumping conditions.

Drainage controls have been proposed which will throttle peak inflows to Pond No. 10 and provide additional storage capacity in the system. Construction of the proposed drainage controls will eliminate the need for the multiple pump systems now serving to control surface runoff at Powhatan No. 6. After construction of the proposed drainage controls, there will be pumps in Pond No. 4, Pond No. 10, and in the drainage collection zone at the refuse disposal area. The latter will be eliminated as the refuse fill achieves design grades (See Section 5.1). Elimination of pumps will provide greater reliability within the drainage control system.

The pump system to be installed in Pond No. 10 will be equipped with a mud switch cut-off device to prevent the operation of the pumps when the pond water has been totally evacuated. The main controls for the pumps will be located at Pond No. 3. A sensor system will shut the Pond No. 10 pumps off when Pond No. 3 has reached its capacity and turn the pumps on as water is drawn from Pond No. 3 into the thickener. An emergency decant pipe will be installed from Pond No. 3 to Pond No. 12 to insure that water never overtops the dike of Pond No. 3.

The water in the thickener will be sampled during thickener operation and the pH determined. Caustic soda in 20% solution will be added manually as necessary to maintain a pH range of 6.0 to 9.0 S.U. The caustic soda will be stored in the existing above-ground storage tank. A line running to the thickener will be operated manually to add caustic soda to the wastewater. The mixing of the caustic soda and wastewater causes the formation of an iron sludge which will be carried to Slurry Pond No. 2 with the thickener underflow.

6.0 Design Details

6.1 Abutment Channel 1

The proposed Abutment Channel 1 is a four (4) feet deep V-ditch lined with riprap or in-place bedrock, which will convey surface water runoff from the west side of the coarse refuse disposal site and adjacent hillsides to the Pond No. 10 impoundment area (See Drawing Nos. 6-030-1 and 6-030-2 for the location and cross-sectional configuration of Abutment Channel 1). The abutment channel consists of four sections, Reach 1 through Reach 4, which have varying alignments and channel bottom slopes. Reaches 1 and 2 are located along the refuse/natural hillside interface and are connected by Culvert 3, a 54-inch diameter R.C.P., located underneath a refuse haul road (Culvert Schedule, Appendix IV). The channel will be extended vertically along with the refuse as the coarse refuse disposal site is increased to a final elevation of about 1145± as shown conceptually on Drawing No. 6-030-1. Reaches 3 and 4 are located on the proposed Rockfill Buttress to be constructed at the toe of the existing Dam No. 1. The channel will discharge from Reach 4 into a stilling basin which will be lined with riprap or cut into bedrock. The stilling basin will serve as an energy dissipator for wastewater entering the Pond No. 10 impoundment area; thereby, avoiding potential erosion of the Pond No. 10 clay blanket materials.

Abutment Channel 1 was designed to convey the estimated peak runoff from its drainage area during a 100 year-6 hour storm event. Discharges from the existing Dam No. 1, Decant No. 3 will be conveyed into the abutment channel through a riprap lined V-ditch to be constructed in 1984 as part of the Dam No. 1 MSHA Abandonment Plan. The existing wastewater control system for this portion of the proposed site drainage improvement plan is presently collecting contaminated surface water from the coarse refuse disposal site and pumping to Pond No. 12. This existing system will be dismantled and the disposal site drainage

redirected to Abutment Channel 1. See Appendix IV for the abutment channel design calculations.

6.2 Abutment Channel 2

Abutment Channel 2 is a three and one-half (3½) feet deep V-ditch to be lined with riprap or constructed on bedrock, which will carry surface water from the east side of the coarse refuse disposal site and adjacent hillsides to the Pond No. 11 Entrance Channel (See Drawing Nos. 6-030-1 and 6-030-2 for the location and configuration of Abutment Channel 2). The proposed abutment channel will be extended to collect wastewater from higher elevations as the coarse refuse disposal area is constructed and reclaimed.

Abutment Channel 2 was designed to control the estimated peak runoff from a 100 year-6 hour storm event for the constructed disposal site above elevation 970± as shown on Drawing No. 6-030-1. Surface water from areas above the abutment channel will be contained in the channel and carried away from the nearby Powhatan No. 6 shaft and ventilation fan area. Presently, wastewater from the adjacent shaft area is collected in a temporary holding pond and pumped into the existing Pond No. 5 drainage area. This system will be completely eliminated as the abutment channel and Pond No. 11 Entrance Channel are installed. See Appendix IV for Abutment Channel 2 design calculations.

6.3 Abutment Channel 3

The proposed Abutment Channel 3 consists of two sections: Reach 1 which has the same cross-sectional configuration and depth as Abutment Channel 2, and Reach 2 which is made up of the existing 42-inch diameter R.C.P. entrance channel (See Drawing Nos. 6-030-1 and 6-030-2 for the location and configuration of Abutment Channel 3). Abutment Channel 3 will control wastewater flows from the east side of the coarse refuse disposal site below elevation 970±, adjacent hillside below the Pond No. 11 Entrance Channel, the mine shaft and ventilation fan areas, and the mine office parking lot. The proposed channel will drain directly to

the existing 42-inch diameter R.C.P. which will be modified to discharge into Drainage Channel 1.

The abutment channel and 42-inch diameter R.C.P. were analyzed considering peak runoff from a 100 year-6 hour storm event for the final confirguration of the disposal area. The analysis indicated that the proposed wastewater conveyance system would control the peak runoff rates from the design storm. The abutment channel will be extended from the existing R.C.P. entrance channel location to the refuse pile elevation 970 bench. Wastewater will be directed away from the shaft area to the 42-inch R.C.P. by a drainage dike as shown on Drawing No. 6-030-1.

6.4 Pond No. 11

Pond No. 11 is an excavated drainage control pond with an additional three (3) feet high earthfill dike to provide the required total pond capacity (See Drawing Nos. 6-030-1 and 6-030-5 for the locations and configurations of Pond No. 11 and appurtenant structures). The proposed pond will be approximately 15-feet deep and will have a crest elevation of 960±. The Pond No. 11 Principal Spillway consists of a 36-inch diameter BCCMP drop inlet with a top elevation equal to 954± and an 18-inch diameter BCCMP barrel which will discharge directly into Drainage Channel 1. The Emergency Spillway is a riprap lined trapezoidal channel with a 15-foot bottom width and an invert elevation of 958±. Abutment Channel 2 will convey wastewater from the coarse refuse disposal site to the Pond No. 11 Entrance Channel which will collect additional drainage from an adjacent hillside area and discharge directly into Pond No. 11. The proposed entrance channel will be riprap lined and have a trapezoidal cross-section with a bottom width of 5-feet and a 3-feet minimum depth (See Drawing No. 6-030-2 for configuration). The emergency spillway will discharge to the Pond No. 11 Exit Channel which has the same depth, configuration and lining as the Pond No. 11 Entrance Channel and will discharge to a tributary of Perkins Run away from the mine area.

Pond No. 11 was designed to collect surface runoff during a 10 year-24 hour storm event from the east side of the disposal site and discharge it through the principal spillway. The proposed principal spillway drop inlet will have 3-feet of 1-inch diameter dewatering holes so that collected wastewater will be discharged at slower rates as well as maintaining a low normal pool elevation of 951± in the pond. Surface runoff from a 10 year-24 hour storm event will be entirely contained and controlled in Pond No. 11 without discharging through the emergency spillway. The entrance channel, emergency spillway and exit channel were all designed to convey peak runoff from a 100 year-6 hour storm event, thereby decreasing the possibility of flooding in mine areas during large rainfalls.

The Pond No. 11 side slopes will be excavated to a ratio of one vertical to two horizontal (1v:2h) and will be constructed from the in-place clay fill materials. The bottom of Pond No. 11 to the emergency spillway invert elevation 958± will be lined with a minimum of 3 feet of compacted clay fill material. The estimated original ground contour elevations in the Pond No. 11 area are shown on page 20A and indicate that about 8 to 10 feet of fill has been placed in the pond area. The natural soil materials, which are very similar to the Perkins Run clay fill materials, will be exposed and used during construction operations. Soil materials will be provided from an approved clay fill borrow area if the compacted, in-place soil materials do not meet OEPA permeability requirements (See Appendix I for test pit information). Laboratory testing of the clay fill materials in the Pond No. 11 area will be performed before construction is initiated.

6.5 Drainage Channel 1

Drainage Channel 1 is a three and one-half (3½) feet deep grass-lined V-ditch made up of two sections (See Drawing Nos. 6-030-1 an 6-030-2 for the location and configuration of Drainage Channel 1). Reach 1 will collect surface runoff and drainage pipe discharges from

the Powhatan No. 6 parking lots, supply areas, Abutment Channel 3 drainage areas, and the Pond No. 11 Principal Spillway. Pump discharges from the mine dewatering wells and the slope and shaft sump pumps will drain directly into Reach 1 at various locations along the channel. Reach 2 of the proposed Drainage Channel 1 will receive runoff from existing Pond No. 5 drainage areas and discharges from Pond No. 12, and will discharge directly to the Pond No. 10 impoundment area. Reach 2 will drain under the existing mine access roads and clean coal belt line through two culverts; Culvert 1 is a 42-inch diameter R.C.P. about 160 feet long and Culvert 2 is a 42-inch diameter R.C.P. about 50 feet long (See Culvert Schedule in Appendix IV). Culvert 2 will discharge wastewater into a flume and stilling basin lined with riprap or cut into bedrock to protect the Pond No. 10 clay blanket materials from erosion. The existing Pond No. 12 will be enlarged and the discharge system modified to trap sediments from the raw coal stockpile area. The proposed Pond No. 12 decant system will consist of an 18-inch diameter PVC pipe (Culvert 4) about 150 feet long and will discharge directly into Reach 2 of Drainage Channel 1.

The proposed drainage channel and appurtenant structures were designed to carry peak runoff from a 10 year-24 hour storm event. The modifications to Pond No. 12 were also designed to pass a 10 year-24 hour design storm in a controlled manner to the drainage channel. About two acres, which presently drain to the existing Pond No. 8 and Pond No. 4 areas, will be collected in the Drainage Channel 1 system and discharged directly to Pond No. 10. The existing Pond No. 5 impoundment will be eliminated by removing the existing pump and decant system so that Drainage Channel 1 may be constructed below the disturbed preparation plant area (See Appendix IV for Drainage Channel 1 design calculations).

6.6 Pond No. 10

The proposed Pond No. 10 impoundment will receive wastewater flows from Abutment Channel 1, Drainage Channel 1, Pond No. 4, Pond No. 2,

adjacent hillsides and seepage moving through Dam No. 1 (See Drawing Nos. 6-030-1 and 6-030-4 for proposed site drainage improvements and Pond No. 10 configurations). The pond will be created by the removal of in-place coarse coal refuse from the existing Perkins Run stream channel and the construction of a clay/rock fill dam. The dam will have a total height of 23± feet and will be made up of an upstream clay fill cutoff constructed to the top of bedrock and a downstream rock fill (See Drawing No. 6-030-4 for Pond No. 10 sections and details). Clay fill materials from adjacent borrow areas will be used to provide a 3 feet thick clay blanket to line the bottom of the pond, covering the limits of the in-place alluvium within the impoundment area. The clay blanket, when constructed, will have a maximum estimated permeability less than 1×10^{-7} cm/sec as per OEPA policy (See Appendix I for test pit logs and Appendix II for laboratory test results). The proposed clay blanket and the clay fill cutoff will form a continuous, impervious barrier between the wastewater contained in the pond and the in-place alluvium. Page 22A shows the original ground surface contour elevations in the pond area and also the upstream limit of the clay blanket. It is imperative that the upstream limit of the clay blanket be established as shown in order to allow seepage from the Dam No. 1 area and adjacent disturbed areas to enter Pond No. 10. The clay blanket will be keyed onto bedrock for the purpose of intercepting groundwater flow. Absence of this clay key would permit seepage to enter the alluvium beneath the clay blanket. Further extension of the clay blanket onto the toe of Dam No. 1 or into adjacent upstream areas would prohibit seepage from entering the pond.

The Pond No. 10 discharge system consists of two 800 GPM pumps (one operational, one stand-by) to pump wastewater into the existing Pond No. 3 and thickener system where it will be utilized in the preparation plant. Ultimately, the wastewater will report to Slurry Pond No. 2 before final discharge into Perkins Run. The proposed emergency spillway system will be an overflow type spillway along the entire length of the dam crest at elevation 856±. The rock fill and crushed stone-lined crest will serve as erosion protection during the operation

of the emergency spillway. The existing Perkins Run stream channel will be removed from the Pond No. 10 area by constructing the proposed stream relocation and grade fill as shown on Drawing No. 6-030-3.

The existing catch basin and pumping systems which presently operate at the toe of Dam No. 1 and pump to Pond No. 2 will be modified to gravity drain into the Pond No. 10 impoundment. Wastewater collected in Pond No. 2, which is presently pumped to Pond No. 3, will be modified to discharge directly to Pond No. 10. The existing Pond No. 2 pumping system will be removed and the 6-inch diameter principal spillway will be extended to a stilling basin to insure the protection of the Pond No. 10 clay blanket. The existing Pond No. 4 dike and impoundment will not be modified, but the existing pumping system will be redirected to discharge into the Drainage Channel 1 stilling basin.

Pond No. 10 was designed to contain and control 10 year-24 hour storm runoff from all of the disturbed Powhatan No. 6 drainage areas. The storm flows will be collected and drained and/or pumped to Pond No. 10 where the runoff will be completely stored in the pond as it is discharged to Pond No. 3 at a rate of 800 GPM (min.). The required Pond No. 10 sediment storage volume of 0.1 ac.ft./ac. disturbed (ODNR) is equal to 9.7 ac.ft. for the disturbed drainage areas upstream of the impoundment. The normal pool elevation of 844.5± set for the discharge system will provide 100% of this upstream requirement. The sediment storage requirement for the Pond No. 4 drainage area will be completely contained in Pond No. 4 as it exists. Maximum normal pool (elevation 853±) is the pond elevation corresponding to the storage of 100% of the sediment requirement and all of the runoff from a 10 year-24 hour storm event. Runoff from storms greater than a 10 year-24 hour event will be contained in Pond No. 10 and/or discharged over the emergency spillway. The peak runoff from a 100 year-24 hour storm event was analyzed to determine its effect on the proposed pond configuration. During the 100 year-24 hour design storm event, the emergency spillway will convey water over the dam crest at a maximum water surface elevation of about

856.5±. The Pond No. 11 drainage area will be controlled during large storm events by the Abutment Channel 2 and Pond No. 11 Entrance Channel system which will divert large storms from the lower mine site areas.

6.7 Perkins Run Stream Relocation

The existing Perkins Run stream channel will be directed away from the proposed Pond No. 10 impoundment area to avoid contamination of the fresh water (See Drawing Nos. 6-030-1 and 6-030-3 for the proposed stream channel relocation and configuration). The permanent stream relocation will allow stream flows from the Perkins Run drainage area and discharges from Dam No. 2 to be passed through an adjacent low ridge without discharging freshwater into Pond No. 11. The channel will be constructed by excavating in-place rock to elevations shown on the drawings, to provide a non-eroding channel bottom. The excavated channel side slopes will be constructed to a stable configuration as shown on Drawing No. 6-030-3a, based on information obtained at the TB-3 location (TB-3, Appendix I). All excavated materials from the stream relocation will be placed in either the rockfill buttress or the Pond No. 10 dam areas. A reinforced concrete inlet control sill will be constructed at the entrance of the stream relocation channel to control water surface elevations and to insure even flow of water across the thirty (30) feet wide channel bottom. The proposed channel bottom slope will be about thirteen (13) percent from channel centerline station 1+50 to station 5+50, where an eighty (80) foot long stilling basin area will be excavated into rock to prevent erosion of the adjacent Captina Creek channel bottom. A grade fill will be constructed in the old stream channel area to insure that fresh water from Perkins Run will discharge through the ridge cut. A clay fill cutoff will be constructed beneath the grade fill, through the in-place alluvium to top of rock; thereby, eliminating groundwater flows from upstream Perkins Run areas to the Pond No. 10 impoundment. A fence will be constructed at the top of cut slopes to remove potential hazards to vehicular traffic and wildlife.

7.0 Reclamation

7.1 Topsoil Handling

Mine No. 6 is located within the Allegheny Plateau physiographic region which is characterized by narrow ridgetops and valleys with steep or very steep side slopes. During normal underground mining operations, the overburden or strata above the coal seam will not be removed or handled. In some instances where resoiling material will be acquired for reclamation of surface disturbed areas, there may be the removal of "B" and "C" Horizon materials.

The topsoil to be removed shall consist of the "A" Horizon or, if less than 6-inches, a 6-inch layer that includes the topsoil and the unconsolidated materials immediately below the "A" Horizon. Due to the nature of operations on surface areas incident to an underground mine, topsoil will often have to be stored for long periods of time before being used in reclamation procedures. Therefore, topsoil will be stockpiled and protected from wind and water erosion by establishing temporary vegetation thereon. The seed mixture to be used in establishing temporary vegetation will normally consist of the following:

Seed Mixture

Type	% Purity	%Germination	Lbs/Acre
Kentucky 31-Tall Fescue	98	85	25
Perennial Rye Grass	97	90	15
Alsike Clover	98	90	15
Birdsfoot Trefoil	98	90	10
Orchard Grass	94	85	10

2 Tons Fresh Hay Mulch/Acre

The application of the above to the topsoil stockpiles will occur as soon as possible after the configuration of the stockpile has been finalized.

7.2 Buffer Zone Protection

In order to construct the proposed permanent relocation of Perkins Run, it will be necessary to conduct activities adjacent to Captina Creek. Captina Creek will be protected from significant contributions of sediment as a direct result of construction activities by the following:

1. The work area will be restricted to that area necessary for the construction of the proposed cut.

2. Any access roads constructed within 100 feet of Captina Creek will be surfaced with a durable, non-eroding material.

3. The relocation channel will have a competent, non-eroding surface designed to carry flows which will be generated by a precipitation event equal to the probable maximum precipitation event of a 6-hour duration.

4. A stilling basin will be constructed just above the confluence of Captina Creek and the proposed channel such that the creek is protected from significant erosion.

5. All construction areas will be revegetated or otherwise permanently stabilized to prevent erosion.

6. No activities other than routine maintenance of the stream relocation will occur in the buffer zone after construction is complete.

7.3 Revegetation

The post-mining land use for the Powhatan No. 6 permit area has been proposed to be undeveloped. In order to attain this land use, The Nacco Mining Company will use a seeding mixture during reclamation that will produce vegetation naturally hardy to the area. Each area to

be seeded will be disced, back-bladed by bulldozer or otherwise treated to adequately prepare a seed bed. A standard soil test will be conducted on representative samples from the area and lime and fertilizer will be added accordingly. Normally, lime will be added by mechanical spreader.

Fertilizer will be added by broadcaster or with a hydroseeder. On each acre of land to be reclaimed, the following will be applied:

Seed Mixture

Type	%Purity	%Germination	Lbs/Acre
Kentucky 31-Tall Fescue (Festuca arundinacea)	98	85	25
Perennial Rye Grass (Lolium peretne)	97	90	10
Birdsfoot Trefoil (Lotus corniculatus)	98	90	10
Alsike Clover (Trifolium hybridum)	98	90	15
Orchard Grass (Dactylis glomerata)	94	85	10
Black Locust (Robinia pseudoacacia)	98	90	3
Spring Barley (March, April only) (Hordeum vulgare-moores)	98	90	50
Buckwheat (May,June only) (Polygonum conuolvuls)	98	90	50
Common Foxtail Millet (July, August only) (Setaria italica)			

Type	%Purity	%Germination	Lbs/Acre
Winter Barley (September, October only) (Hordeum vulgare-Pennrad)	98	90	50
Japanese Millet (wet areas only) (Echinochlos Frumentacco)	98	90	50

Each acre will also receive after or with seeding either 2 tons fresh hay, 50 gallons of "latex" or 1200 lbs. of paper or wood fiber mulch. Mulches will be selected based on field conditions and weather. Application will be accomplished manually, by mechanical blower or by hydroseeder.

7.4 Hydrologic Consequence

Hydrologic Impacts

The hydrologic impacts of Powhatan No. 6 can be described by drawing on information and data presented in the above narrative. Any changes in water quality as a result of surface operations would appear in the surface water monitoring data for Stations D-1, D-2, and D-3 which in addition to monitoring wells W-1 and W-2, presently show little or no degradation of water quality (See Appendix III).

The refuse disposal area contributes small amounts of pollutants to Perkins Run in the form of seepage which are so insignificant as not to impact surface water monitoring Stations D-2 and D-1 (Refer to Appendix III). The refuse disposal area is located to the north and adjacent to a dam constructed of refuse which was built around 1975. The toe of Dam No. 1 is immediately adjacent to Perkins Run to which it intermittently contributes seepage from the interior of the embankment. Seepage impacts from refuse structures appear to be negligible in light of data collected from surface water monitoring Station D-2 and Well Station W-2. Seepage will be collected for treatment and disposal by the proposed Pond No. 10. All stream flows upstream of the proposed Perkins Run stream relocation will be redirected to Captina Creek through a rock

lined channel and stilling basin area to prevent additional sediment loading to Captina Creek.

Probable Hydrologic Consequences

The probable hydrologic consequences that can be predicted as a result of the proposed operations in the permit area include the following:

1. A reduction in rate of surface runoff to Captina Creek and tributaries due to collection and retention in Pond No. 10.

2. Local increases in runoff (both rate and quantity) due to barren and impervious surfaces associated with construction operations.

3. A local decrease in infiltration to shallow aquifers due to the proposed Pond No. 10 clay blanket, and a local increase in infiltration resulting from reduced vegetal cover in the Pond No. 10 clay fill borow areas.

4. No significant net change in water quantity within or near the permit area because there are no identified significant additions to or withdrawals from the hydrologic system.

5. A general improvement in water quality within and near the Perkins Run area since sediment control and water collection and treatment facilities (Pond No. 10) will be constructed and operated in accordance with regulation requirements. This will be confirmed by baseline surface and groundwater monitoring data to be collected.

8.0 Blasting Plan

The permanent relocation of Perkins Run involves the construction of a design cut through the narrow ridge which presently separates Perkins Run and Captina Creek. The drilling program associated with this project revealed the existence of a massive limestone formation in the location of the proposed cut. It will be necessary to utilize explosives to dislodge the limestone to accomplish the relocation of Perkins Run. At this time, the specific amounts of explosives are not known but will be determined by the contractor selected by The Nacco Mining Company. The contractor will possess a certificate of completion and training in the use of explosives as required by Section 1501:13-9-06 O.A.C.:

A. A record of each blast, including seismograph reports, shall be retained for at least three (3) years and shall be available for inspection by the Chief and the public on request. The record shall contain the following data:

1. Name of operator, permittee, or other person conducting the blast.

2. Location, date, and time of blast.

3. Name, signature, and license number of blaster in charge.

4. Direction and distance, in feet, to nearest dwelling, school, church or commercial or institutional building neither owned nor leased by the operator.

5. Weather conditions, including temperature, wind direction, and approximate wind velocity.

6. Type of material blasted.

7. Number of holes, burden, and spacing.

8. Diameter and depth of holes.

9. Types of explosives used.

10. Total weight of explosives used.

11. Maximum weight of explosives detonated within any eight-millisecond period.

12. Maximum number of holes detonated within any eight-millisecond period.

13. Initiation systems.

14. Type and length of stemming.

15. If mats or other protections were used.

16. Type of delay detonator used, and delay periods used.

17. Seismograph records, where required, including:
    a. Seismograph reading, including exact location of seismograph and its distance from the blast.

    b. Name of person taking the seismograph reading.

    c. Name of person and firm analyzing the seismograph records.

18. Sketch of the delay pattern.

19. Number of persons in the blasting crew.

B. The persons responsible for the blasting shall inspect and clear the area prior to blasting. Immediately before detonation, four long signals from a horn will be sounded. An "all clear" signal of two short signals from a horn will be given after blasting.

C. The only public access to the blasting area is abandoned Township Road 112 which is now owned by The Nacco Mining Company. Operations personnel from Powhatan No. 6 will be notified by the persons responsible for the blasting of the times for detonation to insure that the area remains clear. The abandoned township road will be closed to the public.

D. At least ten (10) days, but not more than thirty (30) days, before initiation of the blasting program, The Nacco Mining Company will publish a blasting schedule in the Martins Ferry Times Leader. Copies of the schedule will be distributed by mail to the Belmont County Commissioners and to Mr. Johnnie Moore who resides within one-half (½) mile of the site. In the event that Mr. Moore requests a pre-blast survey, The Nacco Mining Company will conduct the survey and issue the results to Mr. Moore and to the Chief of the Division of Reclamation.

E. Blasting will not be conducted at times different than those listed in the published blasting schedule except in emergency situations where rain, lightning, other atmospheric conditions, or operator or public safety requires unscheduled detonation.

9.0 Pond No. 10 Stability Analysis

Material Properties

Samples obtained in the drilling program were subjected to laboratory testing to determine their engineering properties. Samples taken were tested for classification indexing, water content, remolded

permeability, and compaction characteristic. Summaries of testing and supporting laboratory data sheets are contained in Appendix II.

Clayey soils (CL-CH) sampled in test pits in Perkins Run were remolded at moderate densitites (90-95 percent of standard proctor density) and tested for permeability. Coefficients of permeability were found to range between 1.8×10^{-6} cm/sec to 2.4×10^{-8} cm/sec for these remolded soils which will be used in the construction of the embankment and reservoir blanket at Pond No. 10.

Pond No. 10 Dam

The impounding structure at Pond No. 10 will be comprised essentially of a rockfill embankment with a thick clay upstream face. The contact zone between the two materials will consist of a roughly segregated rock fines zone and a filter fabric. The source of the rockfill will be the blasted excavation site of the Perkins Run diversion channel. The clay will be excavated from the hillside adjacent to the pond.

The dam will be capable of impounding a maximum of 23 feet of water and solids (23 feet is the elevation difference between the upstream toe and the crest of the dam), and has been designed to have the entire crest act as the emergency spillway (See Section 6.6 for Hydrology and Hydraulics). The location and design details of Pond No. 10 are shown on Drawing Nos. 6-030-1, 6-030-4 and 6-030-4a.

The stability considerations for this dam are simplistic since any failure of the upstream face would not endanger the major portion of the structure; any failure of the upstream face could also be easily repaired. Since the major portion of the structure will consist of free-draining rockfill, no phreatic surface will build up in the downstream side of the structure and the stability can be calculated as:

Assume Ø for blasted rockfill = 40 degrees

Assume downstream slope = 14 degrees (1v:4h)

THEN: $FS = \frac{\text{Tan } 40^{0}}{\text{Tan } 14^{0}}$

FS = 3.36 for Pond No. 10